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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,980	04/15/2008	Matan Naftali	P-8551-US	9434
49443	7590	03/10/2010	EXAMINER	
Pearl Cohen Zedek Latzer, LLP			TAMAI, KARL I	
1500 Broadway			ART UNIT	
12th Floor			PAPER NUMBER	
New York, NY 10036			2834	
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			03/10/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/565,980	Applicant(s) NAFTALI ET AL.	
	Examiner KARL I.E. TAMAI	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/24/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

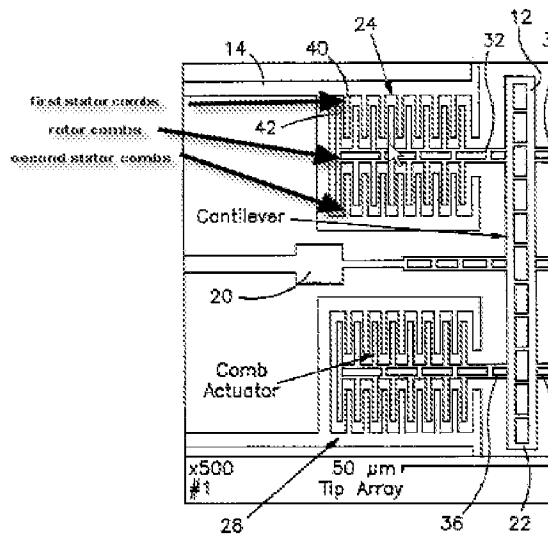
Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 10, 17, 19, 20, 27, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Turner (US 6497141). Turner teaches a method of fabricating a device and an device having a rotor comb element with a main body 12 and a plurality of substantially parallel extensions in a comb 42 arrangement and at least one of a plurality of stator comb elements with a main body 24 and a plurality of substantially parallel extensions in a comb 40 arrangement which are interlaced with the rotor combs 42 in a single layer (figure 2) of a substrate 14.



In regards to claims 2 and 20, Turner teaches 2 stators on opposite sides of the rotor (see annotated figure 1).

In regards to claim 3, Turner teaches MEMS micromachining (col. 6, line 48-59).

In regards to claims 10 and 27, Turner teaches the rotor 12 provided with two substantially opposite torsion bars 16 that define an axis of rotation near an external end surface of the rotor bar 12.

In regards to claims 17 and 33, Turner teaches driving with an alternating voltage with periodic switching frequencies of the rotor to operate in stable and unstable regions for increased sensitivity in taking atomic force measurements (col. 3, lines 15-35).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. (Turner)(US 6497141) in view of German et al. (German)(US 5998906).

Turner teaches every aspect of the invention except at least one plurality of stators positioned and secured by glue. German teaches the stator comb layer 173 is secured to the substrate by fusion bonding 171 to allow simple layered construction of the suspended action through layered substrates (col. 10, lines 1-35). German teaches that glue use in MEMS devices for securing parts such as the mirror (col. 19, line 59-60). German does not teach the stator being secured by glue. It would have been obvious to a person of ordinary skill in the electrostatic actuator art at the time of the invention to construct the actuator of Turner with at least one plurality of stators positioned and secured by glue to allow simple layered construction of the suspended action through layered substrates.

7. Claim 5, 6, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. (Turner)(US 6497141) in view of Yu et al. (Yu)(US 200200121180). Turner teaches every aspect of the invention except displacement limiters, particularly edges of slits around the moving body. Yu teaches slits at 611 around the moving body 610 to provide controlled stops 616, 618, 620, 622 for mover to prevent overswing and shock protection (col. 6, lines 65- col. 7, line 35), where the displacement limiters includes edges in the surrounding body 636. It would have been obvious to a person of ordinary skill in the electrostatic actuator art at the time of the

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invention to construct the actuator of Turner with the edges of the slits providing travel stops to prevent overswing and shock protection, as taught by Yu.

8. Claims 7-9 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. (Turner)(US 6497141) in view of Hopkins et al. (Hopkins)(US 20030082917). Turner teaches there rotor on flexible torsion supports 16 every aspect of the invention except at least one of a plurality of stators are each suspended on flexible supports that are used to reposition the rotor with respect to said at least one of a plurality of stators to achieve realignment and the flexible supports have nonlinear kinematic-dependent rigidity. Hopkins teaches the flexible supports 10 to precisely control the gap distances and electrode position in comb drive (see paragraph 0002). Hopkins teaches a nonlinear kinematic-dependent rigidity because the bend angle of the electrodes are dependent upon the input voltage V in figure 9. It would have been obvious to a person of ordinary skill in the electrostatic actuator art at the time of the invention to construct the actuator of Turner with at least one of a plurality of stators are each suspended on flexible supports that are used to reposition the rotor with respect to stator to achieve realignment and the flexible supports have nonlinear kinematic-dependent rigidity to precisely control the gap between the combs as taught by Hopkins.

9. Claims 11, 12, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. (Turner)(US 6497141) in view of Yamada et al. (Yamada)(US 5959760). Turner teaches every aspect of the invention except the

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torsion bars being near an upper surface and a bottom surface. Yamada teaches torsional support 3a, 3b for an electrostatic actuator which extends vertically near the upper and lower surface of the rotating plate to allow the torsion bars to be integrally formed with the moving plate 2 (col. 4, lines 65-67). It would have been obvious to a person of ordinary skill in the electrostatic actuator art at the time of the invention to construct the actuator of Turner with the torsion bars being near an upper surface and a bottom surface to allow the torsion bars to support the rotor and be integrally formed therein, as taught by Yamada.

10. Claim 13 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. (Turner)(US 6497141) in view of Suzuki (US 5554304). Turner teaches every aspect of the invention except the thickness of the stator being greater than the mover. Suzuki teaches the thickness of the stator teeth are varied to control and balance the forces between the moving and stationary teeth (see figures 1, 3, and col. 10, lines 55-65). It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Turner with the teeth of Suzuki to balance and control the movement of the rotor.

11. Claim 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. (Turner)(US 6497141) in view of Mao et al.(Mao)(US 6771001). Turner teaches every aspect of the invention except controlling motion of the rotor by selecting frequencies of rotor motion thereby determining a first time interval of confined motion

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characterized as the time during which the motion of the rotor is limited by motion limiters and direction of motion is reversed, and a second time interval during which the motion of the rotor is not limited, and tuning the frequencies to a desired ratio between the first time interval and the second time interval. Mao teaches selecting the pulse durations with no limits (minimum) and with a limit (maximum) and selecting (tuning) the drive voltage pulse and duration accordingly (col. 13, lines 8-25) to prevent damage to the actuator from overshooting (col. 5-15). It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Turner with a controlling motion of the rotor by selecting frequencies of rotor motion thereby determining a first time interval of confined motion characterized as the time during which the motion of the rotor is limited by motion limiters and direction of motion is reversed, and a second time interval during which the motion of the rotor is not limited, and tuning the frequencies to a desired ratio between the first time interval and the second time interval, to prevent damage from overshooting in a comb actuator, as suggested by Mao.

12. Claims 14, 15, 18, 31, 32, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner et al. (Turner)(US 6497141) in view of Yamada et al. (Yamada)(US 5959760). Turner teaches every aspect of the invention except the stator being above or below the rotor, AC periodic switching frequency, and the rotor having a mirror. Yamada teaches the stator above and below the rotor (see figure 10b) in an optical mirror 2 MEMS device. Yamada teaches an AC signal is used to Yamada

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teaches AC periodic frequency switching to synchronize the drive pulses and operate the mirror in resonance state (col. 6, lines 37-65). It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the actuator of Turner with the stator electrodes above or below as in Yamada to balance and control the movement of the rotor.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl I.E. Tamai whose telephone number is (571) 272 - 2036.

The examiner can be normally contacted on Monday through Friday from 8:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mrs. Quyen Leung, can be reached at (571) 272 - 8188. The facsimile number for the Group is (571) 273 - 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Karl I Tamai/
PRIMARY PATENT EXAMINER
March 10, 2010